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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,149	07/03/2003	Takeshi Masuda	026390-00009	3313

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EXAMINER

ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
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1792

NOTIFICATION DATE	DELIVERY MODE
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06/11/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No. 10/612,149	Applicant(s) MASUDA ET AL.	
	Examiner Rudy Zervigon	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-6,8-11 and 13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-6,8-11 and 13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 April 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 31st, 2008 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 3-11, and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 1 requires recites the limitation “the discharge port”. There is insufficient antecedent basis for this limitation in the claim. It is presumed for this action that “the discharge port” is actually Applicant’s claimed “exhaust port”.

Claim Rejections - 35 USC § 102

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1, 3, 4, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Okase; Wataru (US 5,884,009 A). Okase teaches a film-forming apparatus (Figure 7; column 15, lines 6-67) comprising a gas-mixing chamber (volume between 7a,b; Figure 7; column 15, lines 6-67) for admixing a raw gas (75a,b; Figure 7; column 15, lines 6-67) and a reactive gas (75a,b; Figure 7; column 15, lines 6-67); a film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) connected to the gas-mixing chamber (volume between 7a,b; Figure 7; column 15, lines 6-67), a circular (see perspective of Figure 6) shower head (7c; Figure 7; column 15, lines 6-67) disposed on the top face of the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67); a stage (61; Figure 7; column 15, lines 6-7) for placing thereon a substrate (W; Figure 7) to be processed, the stage (61; Figure 7; column 15, lines 6-7) being disposed inside the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) in a manner movable up and down ("lifting shaft 60"; Figure 7); an exhaust port (45; Figure 7) for discharging an exhaust gas (75a,b; Figure 7; column 15, lines 6-67) inside the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67), the discharge port (45; Figure 7) being disposed on the side wall (block containing 45; Figure 7) of the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) and below a level of the stage (61; Figure 7; column 15, lines 6-7) at a time of film formation, the discharge port (45; Figure 7) being so constructed and arranged that the exhaust gas generated in a space defined by the shower head (7c; Figure 7; column 15, lines 6-67) and the top face of the stage (61; Figure 7; column 15, lines 6-7) is discharged from the discharge port (45; Figure 7) through a clearance (clearance between block containing 45 and 60; Figure 7) between the side wall (block containing 45; Figure 7) of

the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) and the stage (61; Figure 7; column 15, lines 6-7); and a gas mixture prepared in the gas-mixing chamber (volume between 7a,b; Figure 7; column 15, lines 6-67) being introduced into the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) via the shower head (7c; Figure 7; column 15, lines 6-67), thereby forming a film on the substrate to be processed, wherein a supply port (75b; Figure 7) communicated from the gas-mixing chamber (volume between 7a,b; Figure 7; column 15, lines 6-67) to the shower head (7c; Figure 7; column 15, lines 6-67) to thereby supply the gas mixture is disposed above the shower head (7c; Figure 7; column 15, lines 6-67) and on a diametrical extension line (compare Applicant's Figure 3,4 with Figure 7 of prior art) of the shower head (7c; Figure 7; column 15, lines 6-67), the supply port (75b; Figure 7) being so arranged and constructed that the gas mixture supplied from the gas-mixing flows from a peripheral exterior on the top face of the shower head (7c; Figure 7; column 15, lines 6-67) toward a central portion along the top face thereof, as claimed by claim 1.

Okase further teaches:

- i. The film-forming apparatus (Figure 7; column 15, lines 6-67) as set forth in claim 1, wherein when the flow rate of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture is large, the shower conductance is small and the gas (75a,b; Figure 7; column 15, lines 6-67) mixture is injected into the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) from the central portion of the shower head (7c; Figure 7; column 15, lines 6-67) upon the formation of a film, the apparatus (Figure 7; column 15, lines 6-67) is so designed that it comprises a shower head (7c;

Figure 7; column 15, lines 6-67) having a large diameter, that the distance between the shower head (7c; Figure 7; column 15, lines 6-67) and the substrate (W; Figure 7) to be processed is increased or that a shower head (7c; Figure 7; column 15, lines 6-67) having a large diameter is used and the distance between the shower head (7c; Figure 7; column 15, lines 6-67) and the substrate (W; Figure 7) to be processed is increased, to thus prevent the central gas (75a,b; Figure 7; column 15, lines 6-67) injection of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture and to make the manner of a gas (75a,b; Figure 7; column 15, lines 6-67) injection of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture uniform, as claimed by claim 3. The entirety of Applicant's claim 3 is an intended use of the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

- ii. The film-forming apparatus (Figure 7; column 15, lines 6-67) as set forth in claim 1, wherein when the flow rate of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture is small, the shower conductance is large and the gas (75a,b; Figure 7; column 15, lines 6-67) mixture is injected into the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) from a shower head (7c; Figure 7;

column 15, lines 6-67) and into a region above a substrate (W; Figure 7) to be processed from the periphery of the shower head (7c; Figure 7; column 15, lines 6-67) upon the formation of a film, the apparatus (Figure 7; column 15, lines 6-67) is so designed that it comprises a shower head (7c; Figure 7; column 15, lines 6-67) having a small diameter, that the distance between the shower head (7c; Figure 7; column 15, lines 6-67) and the substrate (W; Figure 7) to be processed is reduced or that a shower head (7c; Figure 7; column 15, lines 6-67) having a small diameter is used and the distance between the shower head (7c; Figure 7; column 15, lines 6-67) and the substrate (W; Figure 7) to be processed is reduced, to thus prevent the peripheral gas (75a,b; Figure 7; column 15, lines 6-67) injection of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture and to make the manner of the gas (75a,b; Figure 7; column 15, lines 6-67) injection of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture uniform, as claimed by claim 4. The entirety of Applicant's claim 4 is an intended use of the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

- iii. The film-forming apparatus (Figure 7; column 15, lines 6-67) as set forth in claim 1, wherein a gas ring (76; Figure 7; column 14; lines 30-45) is disposed at the periphery of

the top face of the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) so that an inert gas (77; Figure 7; column 15, lines 6-67), which is not directly involved in the film formation, can uniformly be introduced into the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) through the gas ring (76; Figure 7; column 14; lines 30-45) and along the inner surface of the side wall of the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67), as claimed by claim 11

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 5, 6, 8, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okase; Wataru (US 5,884,009 A). Okase does not teach the relative dimensions of Okase's showerhead (7c; Figure 7; column 15, lines 6-67) diameter vs. Okase's film forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) diameter as claimed by claims 5. Okase does not teach the relative distance between Okase's substrate (W) and Okase's showerhead (7c; Figure 7; column 15, lines 6-67). Okase further does not teach the operating parameters of pressure and gas flow in the range of the claimed inequalities – claim 6, and 8-10.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize Okase's relative apparatus dimensions and Okase's operating parameters.

Motivation to optimize Okase's relative apparatus dimensions and Okase's operating parameters is for generating uniform thickness of deposited films as taught by Okase (column 13, lines 20-30). Further, it would be obvious to those of ordinary skill in the art to optimize the operation of

the claimed invention (In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); Merck & Co. Inc. v. Biocraft Laboratories Inc., 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); In re Kulling, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05). Further it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art. (Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

9. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okase; Wataru (US 5,884,009 A) in view of Reimer; Paul et al. (US 6,817,377 B1). Okase is discussed above. Okase does not teach a film-forming apparatus (Figure 7; column 15, lines 6-67), which comprises a load-lock chamber for stocking wafers conveyed from a wafer cassette in the atmospheric conditions; a film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67); a conveyer chamber positioned between the load-lock chamber and the film-forming chamber (volume within 7c+piece containing 45; Figure 7; column 15, lines 6-67) - claim 13.

Reimer teaches semiconductor processing apparatus (Figure 1) including a load-lock chamber (25c) for stocking wafers conveyed from a wafer cassette in the atmospheric conditions; a film-forming chamber (25a); a conveyer chamber (25b) positioned between the load-lock chamber (25c) and the film-forming chamber (25a).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Reimer's load-lock chamber (25c) and conveyer chamber (25b) to Okase's apparatus.

Motivation to add Reimer's load-lock chamber (25c) and conveyer chamber (25b) to Okase's apparatus is for process automation as taught by Reimer (column 1; lines 10-13).

Response to Arguments

10. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

11. Applicant's arguments filed March 31st 2008 have been fully considered but they are not persuasive.

12. Applicant states:

“

In other words, the gas mixture from the gas supply port flows from a peripheral exterior on the top face of the shower head toward a central portion along the top face thereof. As such when a plurality of gas injection holes are formed at a certain pitch at the same diameter, the pressure of the gas mixture on the peripheral side of the shower head will substantially be the same as the gas pressure at the gas supply port. Therefore, a substantial amount of gas mixture will be injected toward the substrate (in this case, periphery of the substrate) on the substrate stage through the gas injection holes. Moreover, while the gas mixture flows toward the central portion of the shower head, the gas pressure of the gas mixture lowers and, thus, the amount of gas mixture to be injected toward the substrate on the substrate stage through the gas injection holes becomes smaller.

“

13. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "...when a plurality of gas injection holes are formed at a certain pitch at the same diameter...") are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant states:

“

The claimed invention includes a structural arrangement wherein the exhaust gas inside a space defined by the shower head and the top surface of the stage is discharged through the clearance between the side wall of the film forming chamber and the stage. Therefore, when the exhaust gas flows from the center of the substrate toward the outside thereof on the top of the substrate, the amount of the exhaust gas which is introduced into the space and is discharged will increase.

“

In response, the Examiner's above claim analysis based on the prior art suggests that when the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (*In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01). As such such flow characteristics are presumed to be inherent based on the cited prior art equivalents and their respective functional attributes. The Examiner's conclusion is based on the identical outcomes reported by both Applicant and the prior art:

Applicant:

“

As a result, the claimed invention facilitates and ensures that the supply of the gas mixture to be used in the predetermined processing is substantially uniform over the entire surface of the substrate while using a relatively simple structure to accomplish same. *Thus, the uniformity of the thickness and composition of the film to be formed on the substrate surface is improved.*

“

Okase:

“

Consequently, an oxide film can be formed in a *uniform thickness on the surface of the wafer W*.

“ (column 13, lines 26-30)

Applicant further states:

“

By using the above-described structural arrangement, Okase suffers from a drawback in that the piping of the gas supply pipes becomes complicated as does the structural configuration of the apparatus.

In addition, the work associated with forming, by optimizing the number, diameter, and pitch, of the supply holes in each zone of Okase is also complicated.

“

14. In response, the Examiner believes that Applicant's patentability and the functionality of a prior art apparatus is independent of the perceived and relative "complexity". Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Applicant states:

“

Accordingly, Applicants respectfully submit that Okase does not provide any suggestion or motivation to combine the structure used for supplying the gas mixture to the shower head and the structure used for discharging the exhaust gas in the space defined by the shower head 25 and the top surface of the stage 3, so as to uniformly supply the gas mixture to the entire surface of the substrate.

“

In response, the Examiner asserts that for claims 1, 3, 4, and 11 no such motivation is necessary since the Examiner believes that such claims are *anticipated* by Okase. Further, concerning the remaining claims, the Examiner's grounds for motivation are indeed directed to “uniformly supply the gas mixture to the entire surface of the substrate” as Okase already asserts that such an objective is already accomplished by the apparatus. See above.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1792 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner

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can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

/Rudy Zervigon/

Primary Examiner, Art Unit 1792